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### **REMARKS**

Upon entry of this Amendment, claims 1-16, 18-20 and 22-25 will have been amended. No claims have been cancelled or newly added. Therefore, claims 1-26 remain pending, of which claim 17-26 are withdrawn from consideration due to an election to a restriction requirement. In view of the following comments, allowance of all the claims pending in the application is respectfully requested.

Entry of this Amendment is proper under 37 C.F.R. §1.116 as the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not present any new issues that would require further consideration and/or search as the amendments merely amplify issues discussed throughout the prosecution; (c) do not present any additional claims without canceling a corresponding number of claims; and (d) place the application in better form for appeal, should an appeal be necessary. Entry of this Amendment is thus respectfully requested.

### **REJECTIONS UNDER 35 U.S.C. §103**

Claims 1-13 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 6,217,633 to Ohmi *et al.* ("Ohmi") in view of U.S. Patent No. 5,944,049 to Beyer *et al.* ("Beyer") in view of JP 01188684 to Miyashita *et al.* ("Miyashita"). Applicants traverse this rejection for *at least* the reason that a *prima facie* case of obviousness has not been established.

Although Applicants disagree with the rejection, claims 1, 6 and 10 have been amended to clarify what is being claimed. With this said, Applicants respectfully submit that the cited portions of Ohmi, Beyer, Miyashita and any proper combination thereof, do not disclose, teach or render obvious a substrate treatment device comprising a treatment chamber in which a substrate is to be placed; a supply system configured to supply at least two kinds of treatment gases to said treatment chamber, one of said at least two kinds of treatment gases being liquid under atmospheric pressure; an exhaust system having a turbo molecular pump and a dry pump, configured to exhaust the treatment gases from said treatment chamber; a capturing unit, interposed between said turbo molecular pump and said dry pump and containing fine grains, the capturing unit absorbing by the fine grains at least one kind of the

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treatment gas exhausted from said treatment chamber; and a trap with a cooled plate member therein provided between said turbo molecular pump and said dry pump, the trap to physically absorbing powder by said cooled plate member, as recited in claim 1.

In other words, claim 1 recites, *inter alia*, that at least one of the treatment gases is liquid and the exhaust system contains the turbo molecular pump and the dry pump so that the trap and the capturing unit are provided between the turbo molecular pump and the dry pump.

By way of review and referring to the description of paragraph [0074] of the present application,  $\text{TiCl}_4$  is liquified under the atmospheric pressure so that a large amount of yellow powder is generated from the reaction between  $\text{TiCl}_4$  and  $\text{NH}_3$  and adheres to the inner wall of the exhaust pipe. Moreover, it is difficult to remove the liquefied  $\text{TiCl}_4$  so as not to generate the yellow powders.

In this case, since the interior pressure of the portion of the exhaust pipe located between the turbo molecular pump and the dry pump is set lower than the atmospheric pressure originated from the exhaust of the dry pump,  $\text{TiCl}_4$ , cannot be liquified and thus, can be easily absorbed by the capturing unit with fine grains (e.g., zeolite) therein. Therefore, the large amount of yellow powder cannot be generated from the reaction between  $\text{TiCl}_4$  and  $\text{NH}_3$  and cannot adhere to the inner wall of the exhaust pipe.

In this case,  $\text{TiCl}_4$  means one of the exhaust gases with  $\text{NH}_3$  after the film forming process, e.g., for the TiN film in the chamber.

In contrast, a particle byproduct made of  $\text{NH}_4\text{Cl}$  is trapped and removed by the trap.

Accordingly, by providing the trap and the capturing unit between the turbo molecular pump and the dry pump, such a particle byproduct is trapped and removed at the trap and  $\text{TiCl}_4$ , likely to be liquid, is absorbed by the capturing unit so as not to generate the yellow powders.

In addition, although the interior pressure of the portion of the exhaust pipe located between the turbo molecular pump and the dry pump is set lower than the atmospheric pressure, the interior pressure is set larger than the interior pressure of the portion of the exhaust pipe located between the chamber and the turbo molecular pump. Therefore, by providing the trap and the capturing unit between the turbo molecular pump and the dry pump in the exhaust pipe, the byproduct can be easily trapped and the  $\text{TiCl}_4$ , likely to be liquid, can

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be easily absorbed by the capturing unit.

In contrast, if the trap and the capturing unit are provided between the chamber and the turbo molecular pump in the exhaust pipe, it is difficult to trap the byproduct and absorb  $\text{TiCl}_4$ , likely to be liquid, because the interior pressure of the portion of the exhaust pipe where the trap and the capturing unit are provided.

With regard to the rejection, Ohmi is directed to a process and an apparatus for recovering a noble gas contained in an exhaust gas from a noble gas employing system. In particular, the cited portions of Ohmi teach a process chamber 1 (which the Final Action identifies as the recited treatment chamber) and a film-forming gas source 61 (which the Final Action identifies as the recited supply system) that is connected to the process chamber 1 via a flow regulator 62 and a mixer 63. A gas source 10 for supplying the noble gas is provided downstream of the film-forming gas source 61. A recovery pump 36 (which the Final Action identifies as the recited exhaust system) is connected with the process chamber 1 via a turbo-molecular pump 11a and a detoxicator 73 (which the Final Action identifies as the recited capturing unit) is provided downstream of the recovery pump 36 and the process chamber 1. *See*, Figure 3 and column 10 of Ohmi.

Upon the initiation of the noble gas and the film-forming gas into the process chamber 1, the valve 34a is opened and the valve 34b is closed so that the exhaust gas flowing through the pressure reducing line 17 is sucked by the recovery vacuum pump 36 through the valve 34a and flowed into the detoxicator 73. In the detoxicator 73, components to be removed such as metal particles and reactive gases are removed and detoxicated. *See*, Figure 3 and column 10 of Ohmi.

Applicants respectfully submit that the cited portions of Ohmi do not disclose, teach, or render obvious at least the feature of “an exhaust system having a turbo molecular pump and a dry pump, configured to exhaust the treatment gases from said treatment chamber,” as recited in claim 1. Ohmi’s recovery pump 36 does not have a turbo molecular pump and a dry pump.

Moreover, Applicants respectfully submit that the cited portions of Ohmi do not disclose, teach or render obvious at least the feature of “a capturing unit, interposed between said turbo molecular pump and said dry pump and containing fine grains, the capturing unit

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absorbing by the fine grains at least one kind of the treatment gas exhausted from said treatment chamber,” as recited in claim 1. The detoxicator 73 of Ohmi does not correspond to the capturing unit in claim 1 for least the reason that the detoxicator 73 is not disposed between the recovery vacuum pump 36 and another pump. Thus, Ohmi’s detoxicator 73 is not arranged between a turbo molecular pump and a dry pump, as recited in claim 1. Further, Ohmi’s detoxicator 73 does not contain fine grains, as recited in claim 1.

The cited portions of Beyer and Miyashita do not remedy the deficiencies of Ohmi. In particular, the cited portions of Beyer merely teach regulating pressure in a chamber by either controlling an exhaust pressure at an exhaust side of a first vacuum pump or an internal pressure at a compression stage of the first vacuum pump. Moreover, the cited portions of Miyashita merely teach that a particle trap is provided between a booster pump and a rotary pump. However, the cited portions of Beyer and Miyashita do not disclose or teach that the exhaust system contains the turbo molecular pump and the dry pump so that the trap and the capturing unit are provided between the turbo molecular pump and the dry pump, as recited in claim 1.

Moreover, Applicants respectfully submit that the cited portions of Ohmi, Beyer, Miyashita and any proper combination thereof, do not disclose, teach or render obvious a substrate treatment device comprising, *inter alia*, a supply system configured to supply at least two kinds of treatment gases to said treatment chamber, one of said at least two kinds of treatment gases being liquid under atmospheric pressure; an exhaust system having a turbo molecular pump and a dry pump, configured to exhaust the treatment gases from said treatment chamber; a capturing unit, interposed between said turbo molecular pump and said dry pump, the capturing unit absorbing by a chemical action at least one kind of the treatment gas exhausted from said treatment chamber; and a trap with a cooled plate member therein provided between said turbo molecular pump and said dry pump, the trap physically absorbing powder by said cooled plate member, as recited in claim 6.

In particular, the cited portions of Ohmi, Beyer, Miyashita and any proper combination thereof, do not disclose, teach or render obvious at least the features of the exhaust system contains the turbo molecular pump and the dry pump so that the trap and the

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capturing unit are provided between the turbo molecular pump and the dry pump, as recited in claim 6, for at least similar reasons provided above.

Furthermore, Applicants respectfully submit that the cited portions of Ohmi, Beyer, Miyashita and any proper combination thereof, do not disclose, teach or render obvious a substrate treatment device comprising, *inter alia*, a supply system configured to supply at least two kinds of treatment gases to said treatment chamber, one of said at least two kinds of treatment gases being liquid under atmospheric pressure; an exhaust system having a turbo molecular pump and a dry pump, configured to exhaust the treatment gases from said treatment chamber; an inert gas supply system configured to supply an inert gas into said exhaust system that is on a downstream side of the dry pump on a final stage; a capturing unit, interposed between said turbo molecular pump and said dry pump, the capturing unit absorbing by a chemical action at least one kind of the treatment gas exhausted from said treatment chamber; and a trap with a cooled plate member therein provided between said turbo molecular pump and said dry pump, the trap physically absorbing powder by said cooled plate member, as recited in claim 10.

Again, the cited portions of Ohmi, Beyer, Miyashita and any proper combination thereof, do not disclose, teach or render obvious at least the features of the exhaust system contains the turbo molecular pump and the dry pump so that the trap and the capturing unit are provided between the turbo molecular pump and the dry pump, as recited in claim 10, for at least similar reasons provided above.

Claims 2-5, 7-9 and 11-13 depend from claims 1, 6 and 10, respectively. As discussed above, the cited portions of Ohmi, Beyer, Miyashita and any proper combination thereof, do not disclose, teach or render obvious the features of claims 1, 6 and 10. Claims 1, 6 and 10 are therefore allowable. Thus, claims 2-5, 7-9 and 11-13 are allowable by virtue of their dependence on claims 1, 6 and 10, respectively, and for the additional features they recite.

Thus, Applicants respectfully request that this rejection be withdrawn.

Claims 14-16 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Ohmi in view of Beyer, U.S. Patent No. 5,879,139 to Hayashi *et al.* ("Hayashi") and

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Miyashita. Applicants traverse this rejection for *at least* the reason that a *prima facie* case of obviousness has not been established.

Applicants respectfully submit that the cited portions of Ohmi, Beyer, Hayashi, Miyashita and any proper combination thereof, do not disclose, teach or render obvious a substrate treatment device comprising, *inter alia*, a supply system configured to supply at least two kinds of treatment gases into said treatment chamber, one of said at least two kinds of treatment gases being liquid under atmospheric pressure; an exhaust system having a turbo molecular pump and a dry pump, configured to exhaust the treatment gases from said treatment chamber; a heater configured to heat said exhaust system that is on a downstream side of the dry pump on a final stage; a capturing unit interposed between said turbo molecular pump and said dry pump, the capturing unit absorbing by a chemical action at least one kind of the treatment gas exhausted from said treatment chamber; and a trap with a cooled plate member therein provided between said turbo molecular pump and said dry pump, the trap physically absorbing powder by said cooled plate member, as recited in claim 14.

As discussed above, the cited portions of Ohmi, Beyer, and Miyashita do not disclose, teach or render obvious at least the features of the exhaust system contains the turbo molecular pump and the dry pump so that the trap and the capturing unit are provided between the turbo molecular pump and the dry pump, as recited in claim 14, for at least similar reasons provided above. The addition of Hayashi does not remedy the deficiencies of Ohmi and Beyer. The cited portions of Hayashi merely teach a vacuum processing apparatus with a vacuum pump, in which products of reaction in exhaust gas can be prevented from adhering to the inside of the vacuum pump by heating the inside of the vacuum pump to a temperature higher than the temperature at which products of reaction discharged from a process chamber are separated. *See*, Abstract of Hayashi.

Claims 15 and 16 depend from claim 14. As discussed above, the cited portions of Ohmi, Beyer, Miyashita, Hayashi and any proper combination thereof, do not disclose, teach or render obvious the features of claim 14. Claim 14 is therefore allowable. Thus, claims 15 and 16 are allowable by virtue of their dependence on claim 14, and for the additional features they recite.

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Thus, Applicants respectfully request that this rejection be withdrawn.

### **CONCLUSION**

Having addressed each of the foregoing rejections, it is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, the application is in condition for allowance. Notice to that effect is respectfully requested.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

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Respectfully submitted,

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